

ABSTRACT

A novel method for labeling, detecting, comparing and quantifying molecules from two samples on the same array is described. The method uses at least one labeled sample to be mixed together with one other sample and then allows competitive binding to an array of binding agents. The array captures and profiles various molecules from both samples at predetermined locations for detection and quantitative comparison. When mixing labeled and unlabeled samples at different proportions, relative ratio of labeled and unlabeled molecules can be identified. Such relative ratio in combination with a reference ratio can be used to identify if a certain molecule is more or less abundant between the two samples. The preferred label used for this invention is radioactive isotope. When only labeling one sample, the sample can be labeled using neutron bombardment without changing the chemical structures of molecules within. Alternatively, both samples can be labeled with chemically identical groups containing different radioactive isotopes and then utilizing the isotopes differences in half-life or radiation energy to selectively quantify each of them from the mixture. This method can be used for biomarkers discovery and rapid profiling of such biomarkers to enable point-of-care diagnostic testing and personalized medicine. The method also has applications in proteomics, phosphor-proteomics, transcriptomics, metabolomics, genomics, and glycomics studies.

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